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PEANUT GROWING IN THE COTTON BELT.¹

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INTRODUCTION.

The value of the peanut, both as a money crop and for feeding on the farm, makes it especially desirable in the cropping system in some parts of the cotton belt. The commercial value of the crop increased from \$7,270,515 in 1899 to \$18,271,929 in 1909, and the increase since 1909 has been even greater than before that year. These figures do not represent the full value of the crop, for they do not take into account thousands of acres of peanuts grown for hog-feeding purposes.

The production of peanuts for stock food offers at the present time the greatest opportunity for increasing the acreage, as a few acres could be grown profitably for feed on nearly every farm in the cotton belt. The peanut is one of the best hog foods that can be produced, and it is also valuable for cattle, horses, and mules. Poor soil can be improved very rapidly by growing peanuts for hog-feeding purposes, especially if the hogs are turned into the field and allowed to gather the nuts for themselves. Even if the nuts are harvested and fed to live stock, the soil will be improved if all the manure is returned to the land.

The market demand for peanuts is growing rapidly, and this alone will take care of a considerable increase in acreage. In growing peanuts for market, however, the beginner should bear in mind that it is necessary to have certain machinery that is not ordinarily found in communities where peanuts are not commercially grown.

It should also be borne in mind that there are no well-established markets for peanuts in most sections of the cotton belt and that the price in this territory is governed by that paid in Virginia and North Carolina. No farmer should go into the production of peanuts for market without first knowing whether the quantity grown in his community will be sufficient to justify buying the necessary machinery and to enable the growers to ship the product in car-load lots.

¹ For further information in regard to the cultivation of peanuts and the manufacture of peanut butter, see *Farmers' Bulletin* 431, "The Peanut," and Circular 98 of the Bureau of Plant Industry, "Peanut Butter."

NOTE.—Intended for farmers in the cotton belt who desire to diversify their farming because of the economic crisis which adversely affects the cotton crop at this time.

SOILS FOR PEANUTS.

While peanuts will grow on nearly any type of soil, a sandy or sandy-loam soil, preferably light in color, gives the best results. Dark soils or those containing a considerable percentage of iron are likely to stain the shells, rendering them less desirable for market. For stock-feeding purposes, however, the staining of the shells is of little consequence. Soils that become hard or compact are not adapted to peanut growing, owing to the inability of pod stems, or "pegs," to penetrate the surface.

Poorly drained or sour soils are not suited to the peanut. The ideal soil is a sandy loam containing a considerable amount of humus or vegetable matter, together with an abundance of lime.

PREPARATION OF THE SOIL.

The soil for the peanut should be thoroughly prepared by plowing, harrowing, and dragging or rolling. The time to plow depends upon the character of the soil and its previous treatment. Where there is no danger of the soil washing, fall plowing is advisable, especially if any coarse material is to be turned under. Sod land should also be broken during the fall or winter. On land where there is no crop the plowing need only be done in time to allow the soil to settle before planting.

Land plowed in the spring should be harrowed a short time after plowing in order to prevent the loss of moisture. Fall-plowed land should be harrowed early in the spring and at intervals of a week or ten days until the peanuts are planted.

On soils fairly well drained level culture should be practiced, but where the drainage is poor it is advisable to throw up slight ridges upon which to plant the peanuts. Where water stands upon the land for any considerable length of time peanuts should be planted on ridges, which should be as low and flat as the conditions will allow.

FERTILIZERS AND MANURES.

The peanut responds to the use of commercial fertilizers when the soil contains a reasonable amount of humus, but on soils that are adapted to peanuts large quantities of fertilizers are not necessary. A mixture containing 2 per cent nitrogen, 6 to 8 per cent of phosphoric acid, and 6 to 8 per cent of potash is recommended for sandy or sandy-loam soils. This should be applied at the rate of 200 to 800 pounds to the acre, depending upon the character of the soil. This year it will be difficult to get a fertilizer as high in potash as the one mentioned, but soils that have been well fertilized in the past should produce a good yield of peanuts with 3 or 4 per cent of potash in the mixture. The fertilizer is usually applied in a narrow strip along the row, a 1-horse fertilizer distributor being often used for the purpose. The fertilizer should be thoroughly mixed with the soil. Barnyard or stable manure should not be used the same year the peanuts are to be planted, because of the large number of weed seeds contained in the manure. Fresh manure has a tendency to cause the plants to produce a heavy growth of foliage with a large percentage of poorly filled pods. The manure, therefore, should be applied to the crop grown the previous season.

The peanut as a market crop, if properly handled, is not exhaustive of plant food. In fact, the plant is a great nitrogen gatherer, but if the entire plant, including the root, is removed and no part returned to the soil the peanut is almost as exhaustive of fertility as corn. By feeding the straw and other refuse to farm animals and applying the manure to the land, the fertility may be retained or even increased. When grown exclusively for feeding purposes and hogs are turned into the field to root out the nuts, there is no better soil-improving crop than the peanut.

Importance of lime in the soil.—Peanuts require an abundance of lime to insure proper ripening and the filling of the pods. Where the soil contains limestone or shells it may not be necessary to apply lime, but on soils that are inclined to be in the least sour, lime should be used, 1,000 pounds of fresh-burned lime or 2,000 pounds of fine-ground limestone being applied every four or five years to each acre. The lime should not be applied at the same time as the commercial fertilizer, but when plowing the land. The lime should be applied broadcast after the land is plowed and thoroughly mixed with the soil by harrowing.

Where marl deposits are found the marl may be used as a substitute for lime. It is usually hauled and scattered broadcast upon the land during the winter.

The peanut as a nitrogen gatherer.—The peanut plant, in common with other legumes, has the power of collecting nitrogen from the air and storing it in nodules on its roots. For this reason the peanut is a very desirable soil-improving plant. It should be borne in mind, however, that in order to benefit the soil the main portion of the roots should be left in the ground. The nitrogen-gathering bacteria are usually present in abundance, even where the crop is planted for the first time. This is especially true where the unshelled nuts are planted. If the nodules are not abundant on the roots, artificial inoculation will probably prove an advantage.

PLANTING PEANUTS.

The large-podded peanuts, such as the Virginia Bunch and Virginia Runner, should be shelled for planting, while the small-podded Spanish peanut is usually planted in the shell. The large-podded varieties have thick shells and the peas do not fill the pods, so that germination is retarded. The Spanish peanut has thin shells and the pods are usually well filled. When planting in the pods it is a good plan to soak the peanuts for a few hours to hasten germination. After soaking, the seed should not be allowed to become dry, as the vitality is seriously injured by drying. Shelled seed should never be soaked.

The peanut should not be planted until the soil has become quite warm, and, as a rule, a little later than corn. The Spanish variety may be planted later than the Virginia type, as it requires less time to complete its growth.

In most sections of the cotton belt the Spanish and similar varieties of peanuts may be planted after oats or other crops which come off early in the summer; that is, from the middle of June to the last of July. When growing the Spanish variety for hog-feeding purposes it is a good plan to make three or four plantings, so as to have the

plants come to maturity at different times. The first planting should be made as early as possible and other plantings at intervals of three or four weeks until the first of July in the upper South and up to the last of July in the lower South.

The best distance to plant peanuts varies according to the soil and variety. The Virginia Runner variety on good soil should be planted 12 to 15 inches apart in rows at least 36 inches apart. Virginia Bunch peanuts are planted in rows 30 to 36 inches apart and 9 to 12 inches apart in the row. The Spanish and Valencia varieties are planted in rows 28 to 36 inches apart and 6 to 9 inches in the row. When growing the Spanish variety for feeding purposes it is advisable to plant the seed 6 inches apart in rows 30 inches apart.

The quantity of seed required to plant an acre depends upon the closeness of the planting. As a rule it requires $1\frac{1}{2}$ to 2 pecks of shelled Virginia and $1\frac{1}{2}$ pecks of shelled Spanish peanuts, or 5 to 7 pecks in the pods, to plant an acre. On light, sandy soils the seed should be covered $1\frac{1}{2}$ to 2 inches and 1 inch to $1\frac{1}{4}$ inches on heavy soils.

A large part of the crop is planted with 1-horse peanut planters. Some of these machines are designed for planting the Spanish and similar varieties in the shell. Some peanut growers still plant by hand, opening the row with a single-shovel plow and dropping the nuts at the desired distance. The row is then covered by means of a small cultivator with a notched board fastened across the back of the implement.

THE CULTIVATION OF PEANUTS.

The cultivation of the peanut should begin soon after planting and continue until the vines occupy the ground. If the surface of the soil gets hard before the plants break through, it is a good plan to run a weeder over the field to break the crust. As soon as the rows can be followed regular cultivation should begin. A 2-horse riding cultivator is employed to a large extent in the old peanut-growing regions, although 1-horse cultivators are used by many farmers. A cultivator will give better results than a sweep or plow. The surface should be stirred as soon as possible after a rain in order to prevent the baking of the soil.

After the peanuts begin to "peg," or form pods, they should not be disturbed or given further cultivation. For the last cultivation it is a common practice to employ a cultivator that will roll the soil up under the branches, to provide loose soil for the "pegs" to penetrate.

ROTATION.

Peanuts should be grown in rotation with other crops rather than as a specialty. For the best results the land should not be planted to peanuts oftener than once in three or four years. A good rotation is corn with cowpeas between the rows, followed by winter oats. After the oats are harvested the land should be prepared and Spanish peanuts planted. The next year cotton should be planted and bur or crimson clover sown between the rows of cotton at the last cultivation. The clover is turned under the following spring and the land planted to corn.

HARVESTING.

As no definite rule can be given by which to determine when peanuts are ready to dig, each grower must depend largely upon his own judgment. In the lower South, where frosts do not occur until quite late, the vines assume a yellowish appearance when the peanuts are mature. Peanuts should be dug when the vines have the greatest number of mature pods. Beginners in peanut growing should be careful not to dig too soon, as immature nuts shrivel and are light in weight when cured. A few early-formed peas are likely to sprout before digging time, especially if there is a period of rainy weather about the time the peanuts are maturing, but usually the loss by sprouting is not great.

Peanuts are ordinarily plowed from the ground with a 1-horse turnplow which has the moldboard removed to prevent throwing dirt over the vines. This plow should be so regulated that the peanut root can be cut off at any desired depth. The machine potato digger does very satisfactory work and will dig 8 to 10 acres a day. This machine removes the peanuts from the ground and also shakes off the soil, leaving the vines lying upon the surface. The machine digger costs about \$75, so its use is only practicable where a considerable acreage of peanuts is to be dug. The digging point of the machine digger can be set to cut off the root at any depth desired.

After the peanuts are dug, a gang of workmen shake the vines free from the soil and throw them in small bunches. Where the machine digger is used this shaking is unnecessary, as the machine frees the peanuts from the soil. The vines are left spread on the ground or in small bunches for three or four hours and are then placed in small stacks around a pole to cure. If peanuts are allowed to lie exposed for a considerable time after digging, the pods become discolored and lose in weight and the leaves drop off in handling.

The poles for the peanut stacks should be 3 or 4 inches in diameter and 7 to 8 feet long. These poles or stakes are set into the ground 12 to 18 inches and are well tamped to make them firm. In setting the poles a crowbar or a pointed bar of iron is necessary to make the hole.

Before starting the stack one or two pieces of lath, scrap lumber, or sapling cut from the woods, about 18 inches in length, are nailed at right angles to the stake 8 inches from the ground in order to prevent the peanuts coming in direct contact with the soil. In starting to build the stack a few vines are laid across these pieces, and the stack is then built up by successive layers of vines, the pods being kept well to the center against the stake and the tops to the outside. The stems should have sufficient outward slope to shed water. Occasionally a few vines should be hung around the stake in order to tie the stack together. By this method the pods will be near the center and around the stake, where there is an upward circulation of air and general protection. When the stack has reached the desired height, a bunch of vines is rolled together and pressed down over the point of the stake to form a top, or a little dry grass or a few weeds may be used for this purpose.

It is not advisable to use anything for topping out the small stacks that will prevent the circulation of air. A heavy cover or a covering of green or wet hay will invariably cause the peanuts to spoil.

Curing in barns is not advisable either when curing peanuts for market or where the entire plant is fed to stock, as the crop will cure better in small stacks than when stored in bulk. After the nuts have been cured in the stack from four to six weeks those intended for feeding purposes may be stored in barns or sheds.

PICKING AND THRASHING PEANUTS.

Peanuts should cure in the stack at least three or four weeks before picking or thrashing in order to allow the pods to become dry and the peas firm.

Peanuts are still picked by hand in some sections, especially when the grower has only a few acres. Hand picking is a very laborious and dusty task, but hand-picked nuts are the standard of excellence on the market. The expense of picking by hand is greater than by machinery, and as it is difficult to get enough labor for handwork machines are used by practically all large growers.

Two types of machines are used for picking peanuts from the vines. The common grain thrasher with a special cylinder for peanuts gives quite satisfactory results in removing Spanish peanuts from the vine. The principal objection to cylinder machines is the tendency to break the pods, but by running the cylinder about 400 revolutions per minute and by feeding properly, the breakage can be reduced to a very small percentage. If the peanuts are to be shelled soon after they go on the market, the breaking of the pods is not very objectionable. When oats or wheat are grown in localities where peanuts are raised, the cylinder machine can be used for all of these crops by having two cylinders, one for grain and one for peanuts.

The peanut picker works upon an entirely different principle from the cylinder machines. The picking is done by dragging the vines over a horizontal frame covered with wire mesh. The nuts drop through the wire and at the same time rubber brushes attached to an endless chain act on the lower side of the screen to remove the nuts. In addition to removing the pods from the vines, these machines have cleaning and stemming devices which remove the dirt and the small stems from the pods. The picker type of machine does not break or injure the pods, and for this reason it is especially desirable for picking peanuts that are to be sold in the pod or stored through the summer months.

After the peanuts are picked they should be stored in a dry place, preferably in a mouse-proof building. If the peanuts are damp after their removal from the vines they should be spread on a floor or stored in a well-ventilated building. When the pods are dry they may be put into bags as they come from the machine.

VARIETIES OF PEANUTS.

The principal varieties of peanuts grown for market are the Virginia Bunch, Virginia Runner, and Spanish. For roasted peanuts sold in the pod the Virginia type is mainly grown. For shelled nuts, used in making salted peanuts, peanut candy, peanut butter, etc., the smaller peas of the large-podded varieties are used; also a large part of the Spanish, North Carolina, and Valencia varieties. The Spanish variety furnishes a considerable proportion of the shelled nuts, and

for stock-feeding purposes it is to be preferred, as it can be grown under a wider range of conditions and has a higher food value than any other variety. The Valencia and North Carolina varieties are also grown to some extent for feeding purposes.

PEANUTS FOR LIVE STOCK.

As already mentioned, the peanut is a valuable crop for various types of live stock, especially hogs. Few, if any, crops will produce more pounds of pork on an acre of land or produce it at a lower cost per pound than peanuts. A 40-bushel crop of Spanish peanuts will produce 400 to 500 pounds of pork to the acre, and if the hay is harvested before the hogs are turned in it will nearly pay for the cost of growing the crop. In addition to the profit on the pork, the crop-producing capacity of the soil will be materially increased. By making successive plantings, as previously suggested, the earliest crop should be ready for the hogs by the first of August, and the last crop should be available until the ground freezes. In pasturing hogs on peanuts it is best to confine them to small areas by using portable fences rather than to let them have the run of the whole field.

In some of the Southern States the peanut is extensively used for planting between rows of corn, the peanuts usually being planted at the last cultivation of the corn. After the corn is harvested cattle are turned in to eat the fodder and peanut tops. Following the cattle, the land is pastured by hogs in order to clean up the peanuts. In this way the stubble and roots of the peanuts supply humus and most of the nitrogen stored in the nodules on the roots is left in the soil.

In addition to growing peanuts to be fed in the field, the crop can be cured as described for a market crop and stored in sheds or barns for winter feeding. The entire plant is a very valuable feed for nearly all classes of live stock and can be fed economically. For dairy cows the whole peanut plant makes almost a balanced ration. Peanut hay, consisting of the entire plant after the nuts are removed, has a much higher feeding value than any of the grass hays and about the same value as clover hay. A good crop of peanuts grown for market should yield a ton or more of hay to the acre.

When peanuts are harvested for market hogs are usually turned into the field to glean whatever is left after digging. Many growers fatten two hogs on each acre of peanuts so harvested.

Hogs fattened exclusively on peanuts will not yield a desirable grade of meat or lard, as the meat will be soft and the lard oily. By feeding almost exclusively on corn for the last two or three weeks of the fattening period this difficulty will be overcome. Sweet potatoes and peanuts together make a good ration for hogs, the sweet potato furnishing the carbohydrates and the peanut the protein and fat.

PEANUT OIL.

With a coming shortage of cotton seed from which to make oil and with the great increase in the demand for vegetable oils in this country there is a possibility of building up a peanut-oil industry in the South. By making both cottonseed oil and peanut oil in the same factories it would be possible to keep the mills in operation through-

out the year. With the addition of cleaning and shelling machinery the mills now making cottonseed oil could be used for the manufacture of peanut oil.

Shelled Spanish peanuts contain 50 to 52 per cent of oil, and with up-to-date presses 42 to 44 per cent can be extracted. Good Spanish nuts will yield about 1 gallon of oil to 1 bushel of nuts weighing 30 pounds.

One ton of farmers' stock Spanish peanuts, after they have been cleaned and shelled, will yield 350 to 400 pounds of first-grade or edible oil, 175 to 200 pounds of second-grade oil, and 800 pounds of peanut cake. The cake has about the same food value as cottonseed meal. The present indications are that a considerable quantity of first-grade peanut oil could be disposed of at 75 cents a gallon wholesale and large quantities of second-grade oil at 35 to 40 cents a gallon for soap making.

It will be impossible, however, to establish the peanut-oil industry in the United States until there is a much larger production of peanuts. At present the farmers are finding the production of peanuts profitable for the regular channels of trade and for stock-feeding purposes. A little encouragement on the part of the managers of oil mills is necessary in order to secure a supply of peanuts for oil purposes.

YIELDS, COST, AND RETURNS.

While the average yield of peanuts is only about 34 bushels an acre, with proper methods of culture a yield of 60 bushels of nuts and 1 ton to 1½ tons of forage may be expected. A yield of 75 to 100 bushels an acre is not uncommon, and even higher yields have been obtained.

The cost of growing 40 bushels of peanuts for market should not be more than \$20 or \$25 an acre, including \$5 for the rent of the land. A yield of 60 or more bushels per acre would cost no more than 40 bushels except for thrashing and marketing.

During the past five years the price received by the farmer for Spanish peanuts has ranged between 60 cents and \$1.25 per bushel, depending upon the time they were sold. A yield of 40 bushels at 60 cents would give a return of \$24 for the nuts and a ton of hay worth at least \$10. Even at this low price a fair profit would be made after deducting the cost of growing.